CLAIMS

What is claimed is:

1. A heterostructured field effect transistor having a multi-gate configuration, the gate voltages being individually biased to tailor the potential field.

2. The transistor of claim 1 wherein the potential is a substantially uniform potential.

3. The transistor of claim 2 wherein the heterostructured field effect transistor is a high electron mobility transistor.

4. The transistor of claim 3 wherein the tailoring occurs along a channel of the high electron mobility transistor to create a uniform distribution of energy subbands.

5. The transistor of claim 4 wherein the uniform potential accelerates electrons as they are injected into the channel.

6. The transistor of claim 4 wherein the width of the heterostructure barrier is substantially uniform along the channel.

7. The transistor of claim 6 wherein the tailoring is accomplished by making the slope of the 2D electron gas barrier more uniform along the channel.

8. The transistor of claim 1 wherein the gates have a trapezoidal shape.

9. The transistor of claim 1 wherein the distance between two gates is submicron.

10. The transistor of claim 1 wherein the multi-gate configuration is a two-gate configuration.

11. The transistor of claim 1 wherein the multi-gate configuration is a three-gate configuration.

12. The transistor of claim 1 wherein the multi-gate configuration is a four-gate configuration.

13. The transistor of claim 1 wherein the transconductance of the transistor is substantially linear over a range of gate voltages.